**INTELLIGENT SENTIMENT ANALYSIS IN E-COMMERCE REVIEW (AMAZON)**

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ABSTRACT

These days, businesses rely heavily on internet reviews as a source of information. Companies can utilise these reviews to learn what consumers think of their goods and services. But it would be impossible to read and evaluate every review by hand. A computer program that can automatically read reviews and determine whether they are positive or negative was developed as a result of this study. The software bases its choice on data regarding the words in the reviews. When tested on a set of reviews it had never seen before, the programme was 87% accurate in determining whether the reviews were positive, neutral or negative. This implies that the programme might be a useful resource for companies looking to learn what their customer think of about their product

Contents

[CHAPTER ONE 1](#_Toc154435311)

[INTRODUCTION 1](#_Toc154435312)

[1.1 Introduction 1](#_Toc154435313)

[1.2 Background 2](#_Toc154435314)

[1.3 Problem Statement 4](#_Toc154435315)

[1.4 Research Question 6](#_Toc154435316)

[1.5 Objective of the Study6](#_Toc154435317)

[1.6 Importance of Study 6](#_Toc154435318)

[1.7 Scope of Study 9](#_Toc154435319)

[CHAPTER TWO 10](#_Toc154435320)

[LITERATURE REVIEW 10](#_Toc154435321)

[2.1 Introduction 10](#_Toc154435322)

[2.2 SENTIMENT ANALYSIS: TECHNIQUES 10](#_Toc154435323)

[2.3 Machine Learning method 11](#_Toc154435324)

[2.3.1 MACHINE LEARNING ALGORITHMS 12](#_Toc154435325)

[2.4 LEXICON-BASED METHOD 13](#_Toc154435326)

[2.4.1 LEXICON-BASED APPROACH 13](#_Toc154435327)

[2.2 COMPARISON OF PAST STUDIES 14](#_Toc154435328)

[2.5 CONCLUSION 15](#_Toc154435329)

[RESEARCH METHODOLOGY 16](#_Toc154435330)

[3.1 Introduction 16](#_Toc154435331)

[3.2 Methodology Selection 16](#_Toc154435332)

[3.3 Requirement and Analysis Phase 17](#_Toc154435333)

[3.4 Planning Phase 18](#_Toc154435334)

[3.5 Design and Development Phase 19](#_Toc154435335)

[3.6 Create and Implement Phase 19](#_Toc154435336)

[3.7 Review and Monitor Phase 20](#_Toc154435337)

[3.8 Conclusion 21](#_Toc154435338)

# CHAPTER ONE

# INTRODUCTION

## 1.1 Introduction

Customer evaluations have developed into a wealth of information in the ever-changing world of e-commerce, giving companies a useful tool to assess consumer sentiment, improve product offers, and increase total customer happiness (Racherla, Friske, & Dutt, 2021) . However, the increasing number of online evaluations has made manual review analysis unfeasible and prone to errors, making it difficult for firms to get useful insights from this abundant source of information (Mäntylä, M.V., Graziotin, D., & Kuutila, M. ,2018). Here, sentiment analysis shines as a ray of hope, using machine learning to automate the process of gleaning from massive volumes of consumer feedback:extracting sentiment (Humphreys, A., & Wang, R.J.-H, 2018)

Businesses may now interpret customer reviews with unmatched precision and efficiency thanks to sentiment analysis, a sophisticated area of artificial intelligence and natural language processing (Singh & Sachdeva, 2017). Sentiment analysis extends beyond simply identifying general sentiment because of its capacity to capture the subtleties of human language. It may also be used to analyze consumer feedback and determine the precise features of goods or services that elicit positive, neutral or negative sentiments

The significance of sentiment analysis in e-commerce cannot be overstated. Equipped with this indispensable discernment, enterprises can preemptively tackle customer grievances, maximize product advancement tactics, augment promotional initiatives, customize customer support methodologies, and preserve brand image .Businesses can use sentiment analysis to turn customer feedback into a catalyst for ongoing development, increasing customer satisfaction and accelerating company expansion

## 1.2 Background

Sentiment analysis has made progress in recent years due to the rapid advancements in machine learning techniques and the availability of large-scale text datasets (Singh & Sachdeva, 2017). In the past, sentiment analysis relied on rule-based methods that used created lists of words and phrases associated with negative sentiment (Kaur et al., 2020).However these approaches had limitations in capturing the subtleties of language. Struggled with complex language constructs like sarcasm and irony.

The introduction of machine learning has transformed sentiment analysis by allowing data driven approaches to automatically learn patterns and extract sentiment from text without rules or lexicons . These approaches are commonly referred to as supervised learning methods. They involve training machine learning models on labeled text datasets where each instance is assigned a predetermined sentiment label such, as negative or neutral (Singh & Sachdeva 2017). Once trained these models can be applied to text data to predict the sentiment of each instance.

Apart from learning there have been advancements in unsupervised sentiment analysis approaches as well (Singh & Sachdeva 2017). These techniques do not depend on labeled data. Rather utilize algorithms to detect sentiment by categorizing or grouping text based on similarities, in word choice and meaning . Although unsupervised methods have the benefit of not needing labeled data , they often face challenges in accurately identifying sentiment, particularly in cases where sentiment is expressed in subtle or indirect ways (Singh & Sachdeva, 2017).

The utilization of sentiment analysis extends far beyond the realm of e-commerce. It is widely applied in various domains such as social media analytics, product review analysis, political opinion analysis, and financial market analysis . Social media analytics leverages sentiment analysis to effectively gauge public opinion and comprehend the societal impact that brands, products, and events have (Singh & Sachdeva, 2017). In terms of product review analysis, sentiment analysis assists in identifying customer pain points and gauging satisfaction levels pertaining to specific products or services . As for political opinion analysis; it measures public sentiments towards political candidates parties policies . Lastly Financial market analysts employ Sentiment Analysis by analyzing news articles,social media post etc.to gain insights into prevailing moods within a given marketplace allowing traders to make predictions about stock behavior(Singh&Sachdeva ,2017 )

## 1.3 Problem Statement

Customer evaluations have developed into a wealth of information in the ever-changing world of e-commerce, giving companies a valuable tool to assess consumer sentiment, improve product offers, and increase total customer happiness . However, the increasing number of online evaluations has made manual review analysis unfeasible and prone to errors, making it difficult for firms to get valuable insights from this abundant source of information

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For e-commerce businesses, the amount of client evaluations is growing, which presents a significant difficulty. The sheer amount of data becomes overwhelming as more and more consumers use internet platforms to voice their thoughts about goods and services. Reading and analyzing each review by hand takes time and is prone to human mistakes (Singh, Kaur, & Kaur, 2021). Due to the deluge of customer feedback, it is challenging for businesses to have a thorough grasp of consumer sentiment and pinpoint areas for development. Companies may lose out on important information that might improve their goods, services, and general clientele .

Furthermore, the cost of sentiment analysis technologies is sometimes a major barrier for small firms. These solutions may be inexpensive for small enterprises with tight budgets since they often rely on complex software tools and cutting-edge machine-learning algorithms . Financial resources may be strained by the expenditure necessary to use sentiment analysis methods, especially for businesses just getting started or serving specialty markets with a smaller clientele (Singh, Kaur, & Kaur, 2021).

Due to the high cost of these solutions, small firms are sometimes forced to make tough decisions that put more immediate costs ahead of long-term strategic expenditures. This may make it more difficult for them to get the insightful information that sentiment analysis tools provide, which might put them at a competitive disadvantage compared to more prominent companies that can afford these solutions .

For both big and small e-commerce businesses, the repercussions of failing to use sentiment analysis tools or analyze customer evaluations efficiently can be severe. Companies need to catch up on important information that might aid in pinpointing consumer problems, refining product offers, maximizing marketing approaches, and improving customer experiences (Singh, Kaur, & Kaur, 2021).

Their capacity to effectively compete in the market may need more helpful knowledge.

Sentiment analysis tools that are more accessible, reasonably priced, and especially designed with small enterprises' requirements in mind are required to solve these issues. These solutions compromise usefulness and affordability, so small organizations may benefit from sentiment research without spending excessive money (Singh, Kaur, & Kaur, 2021). Businesses can also look at other approaches to customer review analysis, such as working with data analytics service providers or employing cloud-based solutions.

Generally, the overwhelming amount of customer evaluations and the high cost of sentiment analysis solutions are the leading causes of sentiment analysis issues for e-commerce organizations, especially small businesses. Businesses may improve their goods, services, and overall customer experience by leveraging consumer feedback to uncover valuable insights through creative ideas and alternative approaches.

## 1.4 Research Question

This study presents questions that can provide insight into:

1. What is the method or technique for colleting data reviews from a website?
2. How can the Natural Language Processing (NLP) model be improved to better handle complex and nuanced reviews?
3. How is the accuracy of the sentiment analysis model on a held-out set of electronics product reviews?

## 1.5 Objective of the Study

The objectives of this application study are as follows:

1. To develop web scraping in collecting reviews for electronics product in Amazon website
2. To develop a sentiment analysis model to classify reviews of electronic product into positive, neutral and negative sentiment
3. To evaluate the performance of sentiments analysis model in classify reviews

## 1.6 Importance of Study

Customer evaluations have developed into a veritable gold mine of information in the ever-evolving world of e-commerce, giving companies a priceless tool for assessing consumer sentiment, improving product offers, and raising overall customer satisfaction. The increasing amount of online reviews has made manual review analysis laborious and prone to errors, making it difficult for organizations to get valuable insights from this abundant source of information.

To overcome this difficulty, sentiment analysis proves to be a potent tool. It allows companies to automatically categorize customer reviews as positive, negative, or neutral. Knowing what customers think of companies that sell electronic products is crucial since it helps with product development, customer service, and marketing strategy optimization.

Businesses can better know how customers evaluate their goods and services by examining customer evaluations. Companies can make well-informed decisions to improve their services and customize them to meet client needs by identifying typical pain points, areas of satisfaction, and product characteristics that matter most to customers.

Customer service can also be significantly improved by sentiment analysis. Businesses may spot reoccurring problems, respond quickly to consumer concerns, and commit to solving customer issues by examining customer evaluations. Customer loyalty can rise, negative feedback can be decreased, and this responsiveness can enhance customer pleasure.

Additionally, sentiment analysis may optimize marketing strategies by offering insights into the success of marketing efforts and the influence of product messaging on customer perceptions. Companies can target particular client categories using this data, hone their marketing tactics, and increase their marketing campaigns' total return on investment (ROI).

In summary, sentiment analysis is critical for companies that sell electronic products because it helps them better understand the sentiment of their target market, improve product development, raise customer satisfaction levels, and maximize marketing budgets. Businesses may increase consumer satisfaction, make better decisions, and succeed more in the cutthroat world of e-commerce by utilizing sentiment analysis.

## 1.7 Scope of Study

This research project aims to develop a sentiment analysis model that can identify patterns and categorize sentiments found in customer reviews of electronic products on Amazon. The proposed model will be designed to analyze text data that is not as structured as the user's input and categorize it as positive, negative, or neutral based on the entire input set.

This project has a direct connection to the context of e-dagang and the analysis of user sentiment. Businesses can gain valuable insight into customer perceptions of their products and services by effectively identifying and classifying the sentiments received by customers. This material may be used to improve product quality, increase customer retention, and optimise marketing strategies.

This study advances the area of sentiment analysis by creating a reliable and broadly applicable model for identifying sentiment in electronic product reviews. The suggested concept is adaptable to many e-commerce platforms and may be used with various electronic devices.

The project may encounter constraints related to data availability, computer capabilities, and the intricacy of interpreting human language. However, these restrictions will be overcome by carefully choosing the dataset, using practical algorithms, and considering linguistic quirks unique to the topic.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

Sentiment analysis is natural language processing (NLP) that monitors public opinion and sentiment towards any object or subject. Sentiment analysis, also known as opinion mining, is the process of creating a plan or model to find and analyse data intended to ascertain and investigate people's opinions as stated, either positively or negatively, by analysing a sizable amount of data from reviews. It's an area of research that has a lot of potential applications. In marketing, for instance, it might be useful to monitor market research or offer improved product analytics to identify which iterations of a product or service are popular or troublesome.

## 2.2 SENTIMENT ANALYSIS: TECHNIQUES

Sentiment analysis algorithms have been the subject of numerous applications and advancements over the years.This essay seeks to provide an in-depth analysis and a deeper look at the most often employed strategies in retail, particularly in the E-Commerce industry. As seen in Fig.1, two primary research areas in sentiment classification are machine learning and lexicon. Each of these topics includes subfields. Additionally, a small number of research have combined these two methods and achieved higher sentiment analysis operation efficiency

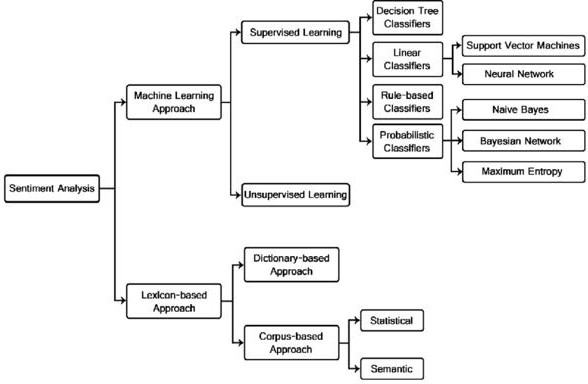


Fig. 1.Sentiment classification techniques

## 2.3 Machine Learning method

Regarding sentiment analysis, machine learning learns and optimizes a sentiment analysis system through natural language processing (NLP). NLP is a branch of computer science that aims to digitally imitate human communication, enabling computers to interpret human speech and meaning.Usually, deep learning models—which data scientists train to analyze conversations and give users quick insights—power machine learning-based sentiment analysis systems. Tone, vocabulary, and sentence structure are just a few of the subtleties of human speech that these deep learning models are intended to detect. Consider machine learning to be the cerebral cortex of a high-quality sentiment analysis tool, continuously learning, thinking, and developing to become increasingly sophisticated. With the help of this innovative technology, businesses can assess everything from customer satisfaction levels to brand sentiment. Automated sentiment analysis relies on machine learning algorithms. These algorithms learn to recognize the sentiment expressed in text data, whether it is neutral, negative, or positive. This chapter explores the various algorithms that are frequently employed to analyze the sentiment of Exommerce reviews .

### 2.3.1 MACHINE LEARNING ALGORITHMS

In the field of sentiment analysis, some examples of machine learning algorithms include:

Naive Bayes

1. A mathematical model called Naïve Bayes determines the likelihood that a word or phrase is positive or negative. Because of its straightforward classification capabilities, which enable it to swiftly ascertain the general sentiment of a conversation, it's one of the most widely used machine learning techniques for sentiment analysis.

Support vector machine

1. Earlier machine learning models were often based on linear regression models that predicted an outcome using X features to determine a Y value. The models divided X and Y values along a line, also known as a plane, stating that Y is the result if X happens. More recently, support vector machine (SVM) learning has become more prominent in sentiment analysis. Although it’s based on linear regression, it’s more advanced and complex, allowing AI to predict more accurate outcomes from the data features it studies

Logistic Regression

1. A machine learning technique known as logistic regression works by multiplying an input value by a weight value. It is a classifier that learns which input properties are most helpful in identifying positive and negative classes. Logistic regression is a probabilistic regression analysis used for classification tasks.

## 2.4 LEXICON-BASED METHOD

Using predetermined word phrases and opinion idioms, the Lexicon-based approach assigns a favorable or negative attitude to each phrase and idiom. In order to ensure proper assignment of words and phrases in statements of view, researchers still manually assign words and sentences in addition to using automatic tools like dictionary and corpus.When it comes to retail sectors like e-commerce websites, this rule assigns semantically similar phrases a comparative slant respect. Numerous reviews and comments contain misspellings and slang words because they are written in different languages. This makes the design and development of automation systems challenging. Furthermore, in order to assess the sentiment of the statement, previous knowledge is required to is required to categorize the polarity of the opinion. Under the lexicon classifier, two methods , the dictionary-based method and the corpus-based method could be used to gather an online dictionary with several viewpoint statements for the appropriate synonyms and antonyms. Up until no more new phrases are discovered, new phrases are repeatedly added to the list of seeds using this method. Using a manual check to clean the list at the end was stress.

## 2.4.1 LEXICON-BASED APPROACH

Generation of opinion lexicon-based is generally performed using one of the two approaches.

* + - 1. **Dictionary-Based Approach**: Provides easy implementation and comprehensible results by analyzing texts according to pre-assigned sentiment values of individual words. It might, however, result in poor accuracy and difficulty with subtleties that depend on context.
      2. **Corpus-based approach**: Using machine learning models that have been trained on labeled datasets, the corpus-based approach achieves higher accuracy but necessitates more data and expertise. Even though the results have the potential to be more accurate, they may be harder to interpret, which makes it challenging to comprehend the sentiment analysis's logic.

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| --- | --- | --- | --- | --- | --- |
| Title | Authors | Year | Algorithm | Objective | Limitations |
| Sentiment Analysis on Amazon Reviews Using Supervised Machine Learning Techniques | Naveed Sultan | 2022 | Naive Bayes, SVM, Random Forest | Sentiment classification of Amazon reviews | Only electronics reviews, no hyperparameter tuning |
| Contextual Sentiment Analysis in User-Generated Reviews Using BERT | Xueli Zhou | 2023 | BERT | Aspect-based sentiment analysis | Computationally intensive, limited domains tested |
| Sarcasm Detection in Amazon Product Reviews | Sahil Jain, Ashish Ranjan, Dipali Baviskar\* | 2022 | RNN, CNN, transformer ensemble | Detect sarcastic sentiment | Limited domains, lack of labeled sarcastic data |
| Semi-Supervised Text Sentiment Classification Using BERT | Haochen Zou & Zitao Wang | 2023 | Semi-supervised BERT | Improve accuracy using unlabeled data | Computationally expensive, single dataset |

## 2.4 COMPARISON OF PAST STUDIES

## 2.6 CONCLUSION

Sentiment analysis is a well-known field that compares customer reviews from various E- Commerce websites using fast computing, massive volumes of data and information, and intricate mathematical models based on machine learning and statistics. Nowadays, using social media sites like Facebook, Instagram, and Twitter for data collection has significantly improved results compared to using data from websites, most of which are positive. To predict the sentiment, which is typically regarded as a primary influencer for the potential and prospective customers to make wise purchase decisions, a variety of strong machine learning algorithms are used. In addition to improving user experience, this can help businesses make decisions or create a model that will improve their relationships with customers. This essay investigates the retail E-Commerce industry as an entity, but it can be used in any industry where feedback and reviews play a critical role in determining whether a business succeeds or fails. With the aid of sentiment analysis, businesses can determine the degree of product acceptance and create policies to improve their offering. Opinion mining tools can also be used by individuals to compare competing products and make purchasing decisions.

CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

The methodology section of this research project delineates the systematic approach and procedures implemented to gather, analyze, and interpret data, with the overarching goal of addressing the research questions and achieving the study objectives. In the realm of sentiment analysis for Amazon E-Commerce reviews, the methodology assumes a pivotal role in establishing the efficacy and dependability of the developed models. This section aims to furnish a comprehensive insight into the employed methodology, elucidating the data collection process, preprocessing techniques, selection of sentiment analysis model, training and validation protocols, evaluation metrics, and any supplementary considerations such as domain-specific nuances or feature engineering. The transparent delineation of the methodology in this research project is geared towards ensuring reproducibility, transparency, and the derivation of robust and meaningful results.

## 3.2 Methodology Selection

The chosen methodology for this research project is Agile, a popular and flexible approach in software development. Agile methodology is well-known for its collaborative and iterative processes, which provide an ideal framework for handling complex tasks and changing requirements. Sentiment analysis of Amazon E-Commerce reviews is in line with this decision.Agile principles will be applied to sentiment analysis to guarantee a methodical and effective development process. Requirement and analysis, planning, design and development, create and implement, review and monitor are the five main phases that make up the Agile methodology. The overall goal of providing a solid sentiment analysis solution suited to the particular difficulties presented by Amazon E-Commerce reviews is greatly advanced by each of these stages. Throughout the development lifecycle, an iterative and collaborative approach will be made easier with the application of Agile principles. This strategy seeks to guarantee that the sentiment analysis model is successfully applied and that it is in line with the project's goals. Agile methodology's flexibility is especially useful for handling the dynamic and constantly changing sentiment found in online reviews, which is why the "Sentiment Analysis of Amazon E-Commerce Reviews" project is a good fit for it.

## 3.3 Requirement and Analysis Phase

The Requirement and Analysis stage is the first Agile phase in the "Sentiment Analysis of Amazon E-Commerce Reviews" project. In this case, the emphasis is on obtaining and examining particular requirements that are necessary to create a sentiment analysis solution that is specifically designed for Amazon E-Commerce reviews. The team uses a variety of methods, including surveys and interviews, in close collaboration with domain experts, stakeholders, and potential end users, to understand the needs of users, the desired functionalities, and any particular limitations related to sentiment analysis on Amazon's platform.

Furthermore, a comprehensive examination of current sentiment analysis tools used in E-Commerce reviews and related literature is carried out. This aids in the identification of best practices and gets the team ready for any obstacles specific to sentiment analysis within the framework of Amazon's e-commerce platform. The sentiment analysis project is made successful overall by the careful documentation and prioritization of the gathered requirements according to their relative importance. In order to ensure that the development efforts are in line with the project goals and user expectations, this phase creates a clear roadmap. It also minimizes ambiguity, lowers risks, and lays the groundwork for the successful development and delivery of the sentiment analysis solution for Amazon E-Commerce reviews.

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## 3.4 Planning Phase

The second Agile phase in the "Sentiment Analysis of Amazon E-Commerce Reviews" project is the planning phase. The creation of a thorough plan and roadmap for the sentiment analysis solution development is the main priority during this crucial phase. The project requirements are divided into smaller, more doable tasks, or user stories, to start the planning phase. The developer collaborates to determine the features, functionalities, and deliverables that will be worked on during the project. After that, these tasks are ranked in order of importance, value, and dependencies. The developer then makes an estimate of the time and resources needed for every task, which makes it easier to create a realistic schedule and allocate resources efficiently.

Creating a backlog, or a prioritized list of tasks to be completed throughout the project, is another aspect of the planning phase. The developer establishes the timeframe for iterative development as well as the order in which tasks will be completed. In addition to organizing the tasks, the developer could plan for the infrastructure, technologies, and tools needed for the creation and testing of the sentiment analysis solution. Choosing suitable frameworks, algorithms, dataset sources, and testing environments may be necessary for this. The product of the planning stage is a thorough plan that specifies the resources, schedule, and deliverables of the project. This plan ensures that the development process is well-structured, organized, and in line with the project goals by acting as a roadmap for the upcoming phases. The developer can efficiently oversee project progress, milestones, and the deployment of the sentiment analysis solution for Amazon E-Commerce reviews if they have a well-defined plan in place.

## 3.5 Design and Development Phase

The project developer works cooperatively to design the user interface (UI) and user experience (UX) of the sentiment analysis solution for company monitoring during the design and development phase of Agile methodology. In order to visualise the solution's layout, navigation, and overall aesthetics with a focus on intuitiveness, user-friendliness, and alignment with the company's monitoring objectives, wireframes, prototypes, and mock-ups must be created. Concurrently, the developer designs the architecture of the sentiment analysis model for the company's sentiment monitoring needs, taking into account factors like model depth, computational needs, and resource availability to choose an appropriate model architecture.

After the Design phase is over, the developer moves on to the Development phase, where they implement the UI, UX, and sentiment analysis model that they designed for company monitoring. Iterative approaches are used to ensure functionality, write code, and integrate libraries and frameworks. The features and sentiment analysis model are guaranteed to meet the requirements through continuous integration and testing. At the end of the phase, a trained model and a functioning prototype are prepared for company monitoring. The foundation for later steps in finishing the sentiment analysis solution designed for business monitoring is laid by evaluating the functionalities and model accuracy and identifying improvements or refinements for more iterations.

## 3.6 Create and Implement Phase

The "Sentiment Analysis of Amazon E-Commerce Reviews" project's Create and Implement Phase of the Agile methodology moves the emphasis to putting the painstakingly thought-out strategies from the Planning Design and Development phases into practice. This crucial stage entails developing and deploying the sentiment analysis programme designed especially for Amazon E-Commerce reviews. Functional components are created by translating the user interface (UI) and user experience (UX) designs that were conceived during the design phase, with an emphasis on natural and intuitive interaction. Concurrently, the thoughtfully chosen sentiment analysis model architecture from the Design stage is put into practice. Writing code, integrating required libraries, and making sure the sentiment analysis model operates properly are all part of this process. The development process is structured into short periods of focused work, using an iterative methodology, with each of these periods concentrating on delivering particular functionalities or features that were identified during the Planning phase . Testing and continuous integration are essential to make sure that the sentiment analysis model and the implemented features work as intended and satisfy the requirements. The advancement is tracked against predetermined benchmarks, and any requisite alterations or enhancements are noted for the next iteration. A functioning prototype of the sentiment analysis solution for Amazon E-Commerce reviews is the result of the Create and Implement Phase, which also lays the groundwork for the project's later stages.

## 3.7 Review and Monitor Phase

The sentiment analysis solution is put through a thorough review, evaluation, and monitoring process in this phase of the project in order to assess its effectiveness, gather input, and make any required improvements. A detailed evaluation of the sentiment analysis solution in relation to the project's goals, specifications, and intended results is part of the review process. Expert reviews, user surveys, usability testing, and other techniques are used to examine the solution's functionality, accuracy, user experience, and overall performance. The feedback and insights obtained in this phase are a valuable source of input for subsequent iterations and enhancements. Simultaneously, ongoing oversight guarantees that the solution upholds intended criteria, including precision in sentiment analysis outcomes, responsiveness, and detection of possible malfunctions or performance problems. Frequent monitoring enables the project team to take proactive measures by assisting in the early identification of developing problems or areas in need of improvement.

Based on the findings of the review and monitoring, improvements and refinements are determined and given priority. This feedback is easily integrated into the backlog and roadmap for the solution for future updates or iterations, in line with the Agile continuous improvement principle. The sentiment analysis solution can change over time to accommodate new technology and changing user needs, thanks to the agile approach. Throughout this phase, continuous collaboration and communication with stakeholders, end users, and domain experts guarantee the solution's applicability, efficacy, and alignment with changing needs and expectations. Consistent evaluations, performance tracking, and feedback integration enable the developer to make well-informed decisions regarding upcoming revisions, updates, and possible growth of the sentiment analysis solution. In this phase, which marks the end of the Agile methodology, the solution is continuously monitored, improved, and refined to ensure long-term success and usability in the ever-changing context of sentiment analysis reviews on Amazon E-Commerce.

## 3.8 Conclusion

In conclusion, it is clear that using the Agile methodology to develop the sentiment analysis solution for Amazon E-Commerce Reviews is a sensible and successful strategy. Planning, Design and Development Create and Implementation, Review and Monitor, and Requirement and Analysis are the five phases that provide an organised and iterative process that guarantees effective project management and the production of high-quality results. Regular stakeholder involvement, ongoing communication, continuous integration, and testing are all facilitated by the Agile methodology, which enables early feedback, efficient problem-solving, and an improved development process. The developer can effectively manage resources, set priorities, and produce a strong sentiment analysis solution with this method. Continuous observation and assessment enable prompt adjustments, guaranteeing the sentiment analysis solution's long-term viability and usability. The Agile methodology optimises the development of solutions for sentiment analysis in Amazon E-Commerce reviews to effectively meet project requirements and user needs by offering a collaborative and structured framework.

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